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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,586	03/30/2001	Harold S. Stone	14406 (NECI 1100)	1271
23389	7590	01/30/2004	EXAMINER TUCKER, WESLEY J	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA GARDEN CITY, NY 11530			ART UNIT 2623	PAPER NUMBER 2

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/822,586

Applicant(s)

STONE ET AL.

Examiner

Wes Tucker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 26-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 26-28 claim "the computer product of claim 1." Claim 1 does not claim a computer product. It is assumed that claims 26-28 are intended to depend from claim 23 and are therefore addressed accordingly. However appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 5, 12, 16, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,075,905 to Herman et al.

With regard to claim 1, Herman discloses a method for registration of first and second images out of registration.

Herman discloses step (a) making the edges in the first and second images more prominent (column 21, lines 40-42).

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Herman further discloses step (b) thresholding the first and second images from the previous step using a threshold for which N percent of the pixels of each of the first and second images are over the threshold (column, lines 42-43). Here Herman discloses thresholding the input images pixel-by-pixel. Herman does not specifically disclose N percent pixels that occur over the threshold. However it is inherent that a certain percent of pixels fall above and below a given set threshold.

Herman further discloses step (c) reducing the resolution of the first and second images from the previous step (column 21, lines 45-46).

Herman further discloses step (d) registering the first and second images of reduced resolution from the previous step (column 21, lines 54-56).

With regard to claim 5, Herman discloses the method of claim 1, wherein step (a) comprises filtering the first and second images with an edge-enhancement filter (column 21, lines 40-43).

With regard to claim 12, Herman discloses a program storage device readable by machine, tangibly embodying a program of instructions executable by machine to perform method steps for registration of first and second images out of registration (column 21, lines 40-55). Herman discloses an apparatus for performing registration of images using the steps claimed in claim 1. Herman discloses that his method may be performed automatically by the system or guided by a user interface (abstract). A program storage device readable by machine is inherent in the embodiment disclosed by Herman.

With regard to claim 16, the discussion of claim 5 applies.

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With regard to claim 23, the discussions of claims 1 and 12 apply. A computer program product and computer readable code are inherent in the apparatus disclosed by Herman.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 13, 14 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,075,905 to Herman et al. in view of U.S. Patent 5,325,200 to Jaffrey et al.

With regard to claims 2 and 3, Herman discloses the method of claim 1, but does not disclose the step of blurring the first and second images from the thresholding step with a blurring filter that thickens each pixel by extending the pixel in a predetermined number of pixels in all four directions from a central pixel. Herman discloses thresholding the image and then subjecting the image to a distance transform to better distinguish the image structure. The effect of the distance transform is the same as blurring the images to better distinguish the image structure so that the lower resolution image in the next step will have more usable content. Jaffrey discloses a blurring filter that thickens the central pixel by replacing the surrounding pixels in a 3x3 window with the average of the pixel intensity values (column 3, lines 29-35). The effect of this kind of blurring effectively widens image features and edges for easier registration. Therefore it would be obvious to one of ordinary skill in the

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art at the time of invention to use the average window method of Jaffrey in place of the distance transform step in the method of Herman in order to widen edges in the images in order to perform more effective registration of images.

With regard to claims 13 and 14, the discussion of claims 2 and 3 applies.

With regard to claim 24, the discussion of claims 2 and 3 applies.

6. Claims 4, 6, 7, 15, 17, 18, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,075,905 to Herman et al.

With regard to claim 4, Herman discloses the method of claim 1. Herman does not disclose the step of increasing the resolution of the registered first and second images from the registering step. Herman does disclose using pyramids consisting of low to high resolutions, and it would be desirable to increase the resolution to restore the resolution after it has been reduced and the images have been registered in order to restore the image content. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to increase the resolution once the images have been registered in order to restore image content lost in the image resolution reduction process.

With regard to claim 6, Herman discloses the method of claim 1, wherein N is the percentage of pixels over the threshold. Herman does not disclose N as being the particular range of 70-80 percent. However any range of thresholding can be determined through the practice of routine experimentation to determine the optimal range of useful pixels. Therefore it would have been obvious to one of ordinary skill in the art to use a threshold to select any percentage range in order to achieve desirable results after performing routine experimentation.

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With regard to claim 7, the discussion of claim 6 applies. Any percentage can be determined through routine experimentation.

With regard to claim 15, the discussion of claim 4 applies.

With regard to claims 17 and 18, the discussion of claims 6 and 7 applies.

With regard to claim 24, the discussion of claims 4 and 15 applies.

7. Claims 8, 19, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,075,905 to Herman et al. in view of U.S. Patent 6,591,196 to Yakhini et al.

With regard to claim 8, Herman discloses the method of claim 1, but does not disclose wherein step (b) further comprises choosing N automatically by computing a histogram of pixel intensities and setting the threshold for which N percent are over the threshold for a predetermined value of N. Yakhini discloses computing a histogram (Fig. 17) of pixel intensity values and determining a pixel threshold value from the histogram and the threshold is predetermined to be a certain percentile (column 10, lines 65-70 and column 11, lines 1-5). Yakhini teaches that the threshold may be optimized according to the features and characteristics of the image (column 11, lines 5-8). Therefore it would be obvious to one of ordinary skill in the art at the time of invention to use the histogram calculation method as taught by Yakhini to choose the percentile threshold in the method of Herman in order to optimize the chosen threshold according to the characteristics determined by the histogram.

With regard to claim 19, the discussion of claim 8 applies.

With regard to claim 26, the discussion of claims 8 and 19 applies.

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8. Claims 9, 20, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,075,905 to Herman et al. in view of U.S. Patent 4,972,359 to Silver et al.

With regard to claim 9, Herman discloses the method of claim 1, but does not disclose wherein step (c) comprises reducing the resolution of each of the first and second images from the previous step by a factor used to partition each of the first and second images from the previous step into square blocks of pixels and replacing each square with the sum of the pixel values. Silver discloses a method of spatial averaging in which the resolution of an image is reduced by averaging blocks of pixels. Silver teaches that spatial averaging is used to reduce processing time (column 1, lines 35-40). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to reduce the resolution by partitioning the image into blocks as taught by Silver in order to reduce processing time in the method of Herman.

With regard to claim 20, the discussion of claim 9 applies.

With regard to claim 27, the discussion of claims 9 and 20 applies.

9. Claims 10, 11, 21, 22, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,075,905 to Herman et al. in view of U.S. Patent 5,295,200 to Boyer et al.

With regard to claims 10 and 11, Herman discloses the method of claim 1, but does not disclose using normalized correlation or Fourier technique. Boyer discloses determining the alignment of two images using normalized Fourier correlation integrals (column 6, lines 10-25). Boyer teaches that Fourier correlation is useful for obtaining a rapid numerical measure of the similarity

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between the two images to be registered. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use normalized correlation and Fourier technique in order to increase the processing speed by obtaining rapid calculations of similarity between images to be registered.

With regard to claims 21 and 22, the discussion of claims 10 and 11 applies.

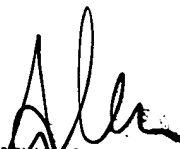
With regard to claim 28, the discussion of claims 10 and 21 applies.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is 703-305-6700. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Wes Tucker
1-23-04


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